REMARKS

This Response responds to the Office Action dated December 10, 2004 in which the Examiner rejected claims 1 and 2 under 35 U.S.C. §102(b) and objected to claims 3-6 as being dependent upon a rejected base claim but would be allowable if rewritten in independent form.

Claim 1 claims a ground fault detection circuit detecting whether a power output node of a switching regulator, located between a power transistor and an inductor, is grounded. The ground fault detection circuit comprises a current supply circuit and a determination circuit. The current supply circuit supplies the power output node with a pulsed current continuously. The determination circuit determines, from a potential of the power output node, whether the power output node is grounded.

Through the structure of the claimed invention a) having a current supply circuit supplying a power output node, which is located between a power transistor and an inductor, with a pulsed current continuously and b) having a determination circuit determine, from a potential of the power output node, whether the power output node is grounded, as claimed in claim 1, the claimed invention provides a ground fault detection circuit which can accurately detect whether a switching regulator's power output node is grounded. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claims 1 and 2 were rejected under 35 U.S.C. §102(b) as being anticipated by *Massie* (U.S. Patent No. 5,587,650).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §102(b). The claims have been reviewed in light of the Office Action, and

for reasons which will be set forth below, applicant respectfully requests the Examiner withdraws the rejection to the claims and allows the claims to issue.

Massie appears to disclose a switching regulator circuit that provides switching regulation without requiring a separate oscillator circuit. (col. 1, lines 65-67) FIG. 2 shows an improved DC-DC converter in block diagram form. The DC-DC converter 200 includes a power switching transistor 205, an output stage 210, a pre-drive circuit 215, and a drive circuit 220. The power switching transistor 205 is switched on and off, coupling and decoupling the DC input voltage to the output stage, in response to a series of drive pulses provided by the drive circuit 220. The output stage 210 averages the input pulses to output a DC output voltage V_{out} and associated ripple voltage. The pre-drive circuit 215 includes a precision voltage reference circuit and is coupled to sense and compare the output voltage V_{out} to a reference voltage V_{ref}. The pre-drive circuit 215 provides a pre-drive signal to the input of the drive circuit 220 for varying the duration and frequency of the drive pulses provided by the drive circuit 220. The pre-drive signal is provided in response to the comparison between V_{out} and V_{ref}. (col. 2, line 58 through col. 3. line 15) The gate of the power switching transistor 305 is coupled to a node 301 for receiving drive pulses from the drive circuit 220; the drain is coupled to receive the DC input voltage; and the source is coupled to the output stage 210 at node 302. (col. 3, lines 63-67) The output stage 210 of the DC-DC converter 300 generally includes catch diode 315, inductor 317, and capacitor 319. (col. 3, lines 19-21) The purpose of the catch diode 315 is to prevent a voltage level that is greater than one diode drop below ground from being presented at the source of power switching transistor 305. The drive circuit 200 of DC-DC converter 300 includes transistors 335 and 341, resistor 337, 343, 349, and 352, diodes 328 and 329, and capacitors 345, 347, 351,

353, and 327. The pre-drive signal is provided to the gate of transistor 335 at node 304 for switching field effect transistor 335 on and off. When transistor 335 is switched off, npn transistor 341 provides a high current drive signal that is approximately equal to VDD+VIN at the gate of power switching transistor 305 such that power switching transistor 305 is switched on quickly. Transistor 341 is part of a bootstrap circuit that further includes diode 328, resistors 337 and 343, and capacitor 327. Transistor 341 may be 2N4401, the value of resistor 337 may be one kΩ, the value of resistor 343 may be 24Ω, and the value of capacitor 327 may be 0.1 μF. When the pre-drive signal is sufficiently high, transistor 335 is switched on, which provides a path from the gate of power switching transistor 305, through diode 339, to ground. Thus, diode 339 provides a high gate sink current such that the gate of power switching transistor 305 is discharged quickly towards ground, and power switching transistor 305 is switched off quickly to reduce switching losses. (col. 5, lines 33-53) FIG. 4 shows a waveforms that illustrate the operation of the DC-DC converter shown in FIG. 3. Waveform 405 shows the voltage at the output of the voltage reference IC 355. Waveform 410 shows the ripple voltage of the output stage 210. Waveform 415 shows the pre-drive signal applied to the gate of transistor 335. Waveform 420 shows the drive signal applied to the gate of power switching transistor 305. (col. 4, lines 59-65)

Thus, *Massie* merely discloses a drive circuit 220 which outputs a series of drive pulses to a power switching transistor 205 in order to switch the transistor on and off. Furthermore, the power switching transistor 205 of *Massie* has a gate coupled to a node 301 for receiving the drive pulses from the drive circuit 220, a drain coupled to receive a DC output voltage and a source coupled to an output stage 210 at node 302 (column 2, lines 61-64, column 3, lines 63-67). Thus, nothing

in *Massie* shows, teaches or suggests a current supply circuit supplying a power output node, located between a power transistor and an inductor with a pulsed current continuously, as claimed in claim 1. Rather, *Massie* merely discloses that the drive circuit 220 supplies driving pulses to the gate of a power switching transistor 305 and not to a power output node located between a power transistor and an inductor. Thus, nothing in *Massie* shows, teaches or suggests continuously supplying a power output node with a pulsed current as claimed in claim 1.

Additionally, *Massie* merely discloses an output stage 210 of a DC-DC converter 300 includes a catch diode 315, inductor 317 and capacitor 319, where the purpose of the catch diode 315 is to prevent a voltage level that is greater than one diode drop below ground from being presented at the source of power switching transistor 305 (column 4, lines 19-21, 55-58). Thus nothing in *Massie* shows, teaches or suggests a determination circuit which determines, from a potential of a power output node located between a power transistor and an inductor, whether the power output node is grounded as claimed in claim 1. Rather, *Massie* merely discloses a catch diode 31 which prevents a voltage level that is greater than one diode drop below ground from being presented at the source of power switching transistor 305.

Finally, *Massie* merely discloses a drive circuit 220 including a transistor 341 that is part of a bootstrap circuit that further includes diode 328, resistors 337 and 343 and capacitor 327 in order to quickly turn on the gate of power switching transistor 305 and turn on transistor 335 to rapidly withdraw electric charge from power transistor switch 305 via diode 339 to control the gate of power switch 305. Thus nothing in *Massie* shows, teaches or suggests a current supply circuit supplying a power output node and including a transistor, a resistor and a diode

having a cathode connected to a power output node to detect whether a power output node is grounded as claimed in claim 2. Rather, *Massie* merely discloses a transistor 341 which is part of a bootstrap circuit.

Since nothing in *Massie* shows, teaches or suggests a) a power supply circuit supplying a power output node located between a power transistor and an inductor with a pulsed current continuously, and a determination circuit determining from a potential of the power output node, located between a power transistor and an inductor, whether the power output node is grounded as claimed in claim 1, and b) a current supply circuit includes a transistor, a resistor and a first diode having a cathode connected to the power output node as claimed in claim 2, applicant respectfully requests the Examiner withdraws the rejection to claims 1 and 2 under 35 U.S.C. §102(b).

Since objected to claims 3-6 depend from allowable claims, applicant respectfully requests the Examiner withdraws the objection thereto.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to contact, by telephone, the

applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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